Electrical Power and Machines Engineering Department

Tanta University

Faculty of Engineering

ELECTRICAL POWER SYSTEM (1) EXPERIMENTS

FOR 2ND YEAR STUDENT

2017

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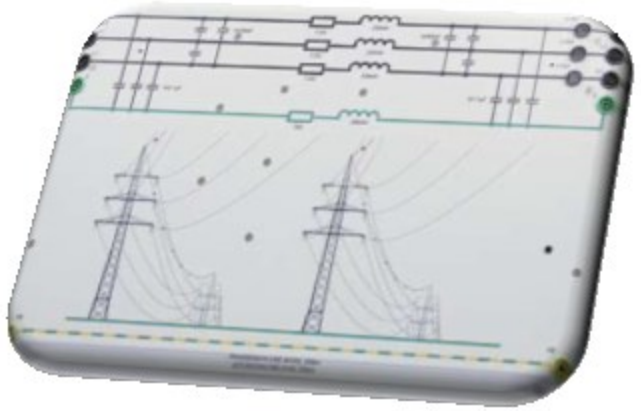
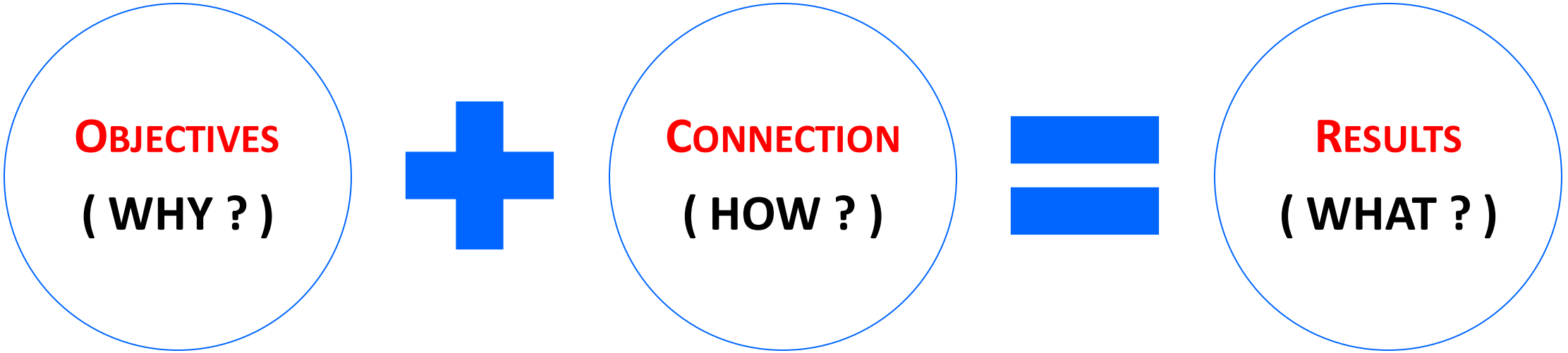


OUTLINES



EXP (1)

Performance of Medium Transmission Lines (T-Model)

80 km < L < 250 km + Up to 100 kV

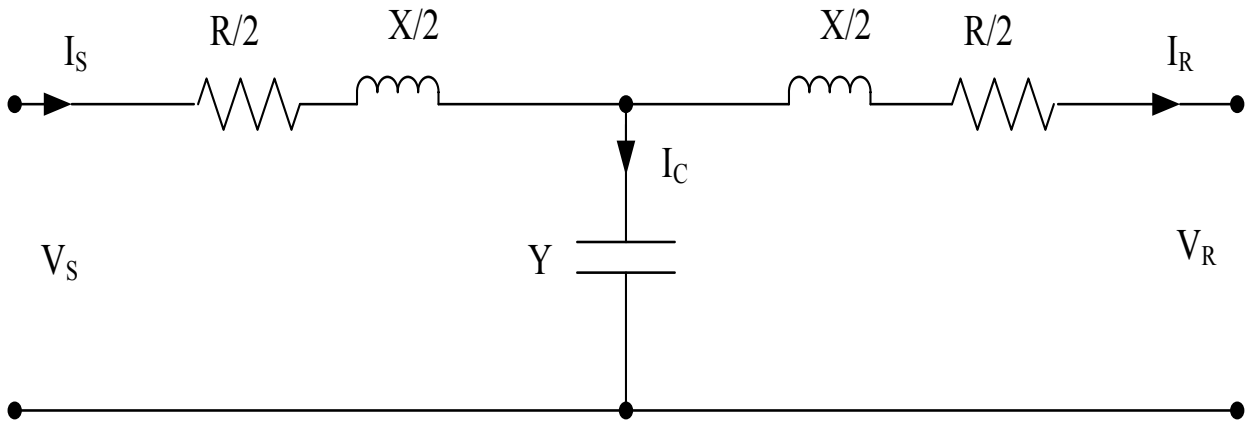
OBJECTIVES

TL resistance (R_{av}), reactance (X_{av}) and substance (Y_{av})

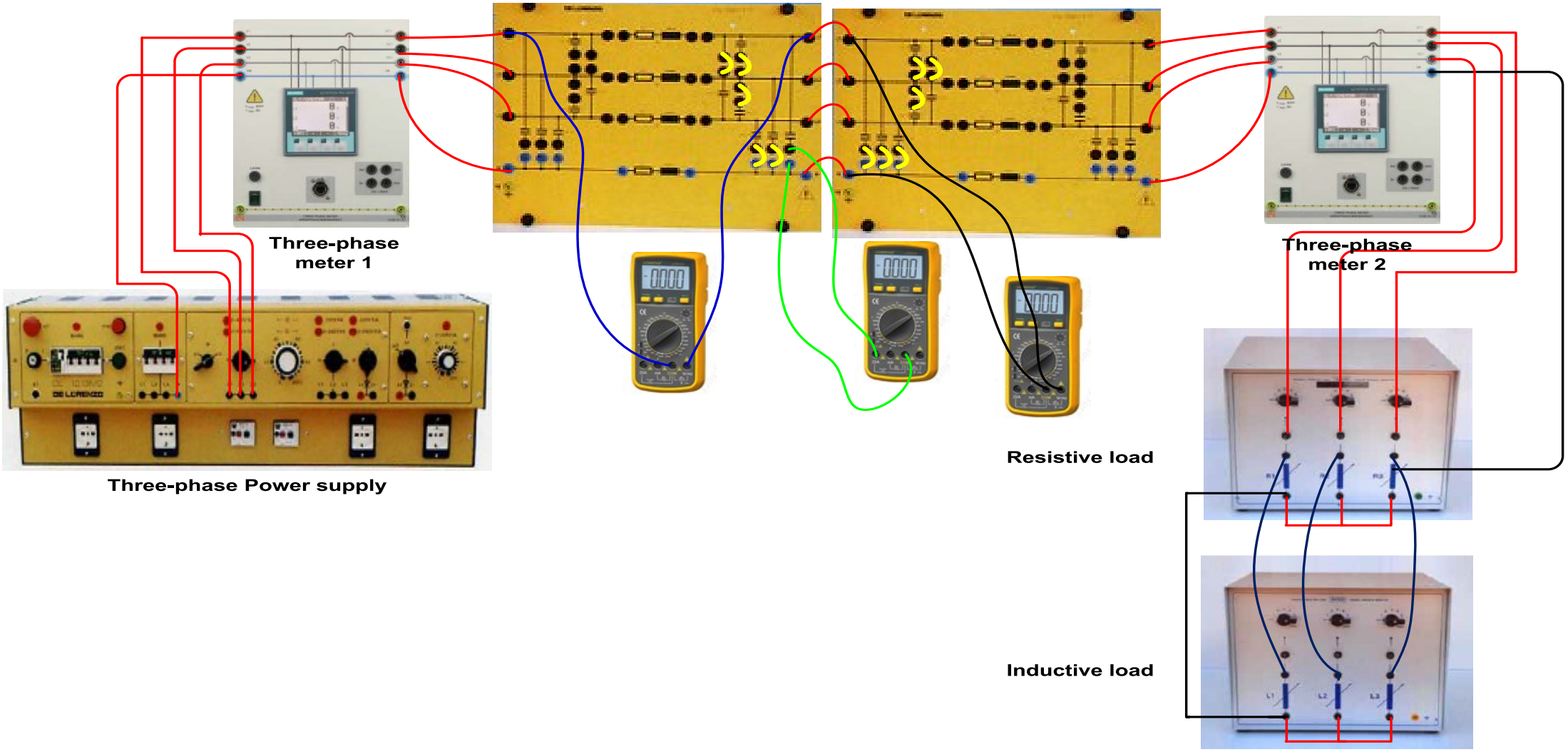
C/Cs of the medium TL

Plot the phasor diagram at lag, unity, and lead power factors

Medium TL
(from 80 up to 250 km)

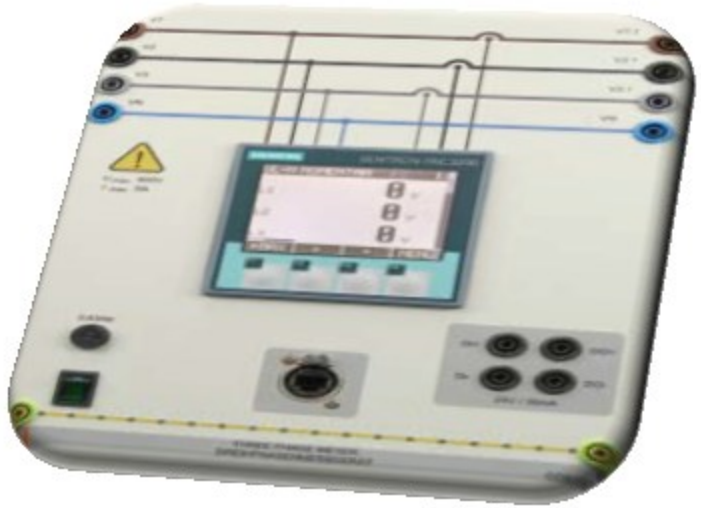


CONNECTION DIAGRAM



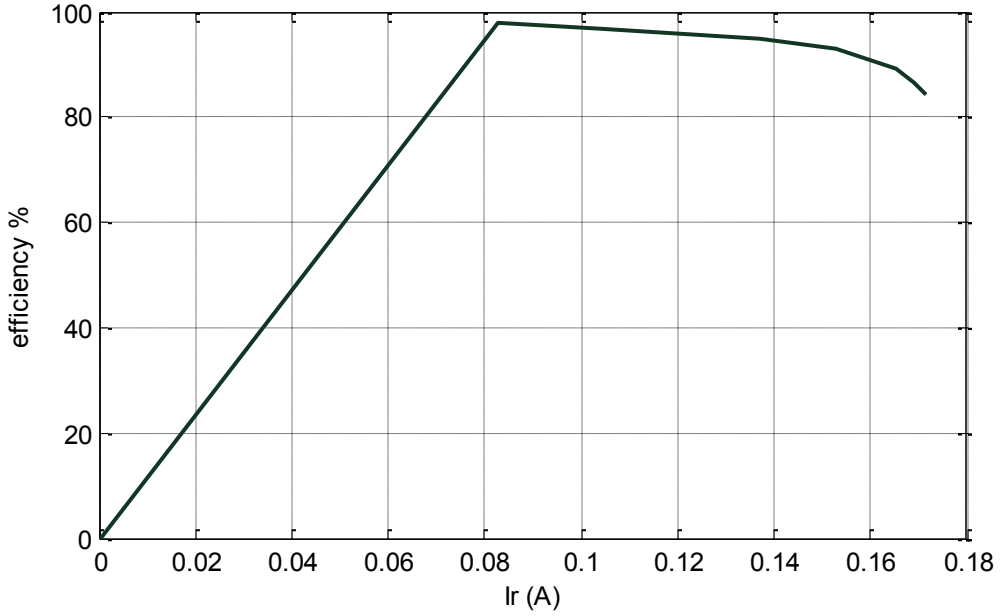
RESULTS

R	V_s	I_r	V_r	P_r	P_s	Vc	Ic	I_L	ΔV/2	ζ%	ε%	R	Z	Y	X_L
∞	✓	✓	✓	✓	✓	✓	✓	✓	✓	?	?	?	?	?	?
1															
2															
3															
4															
5															

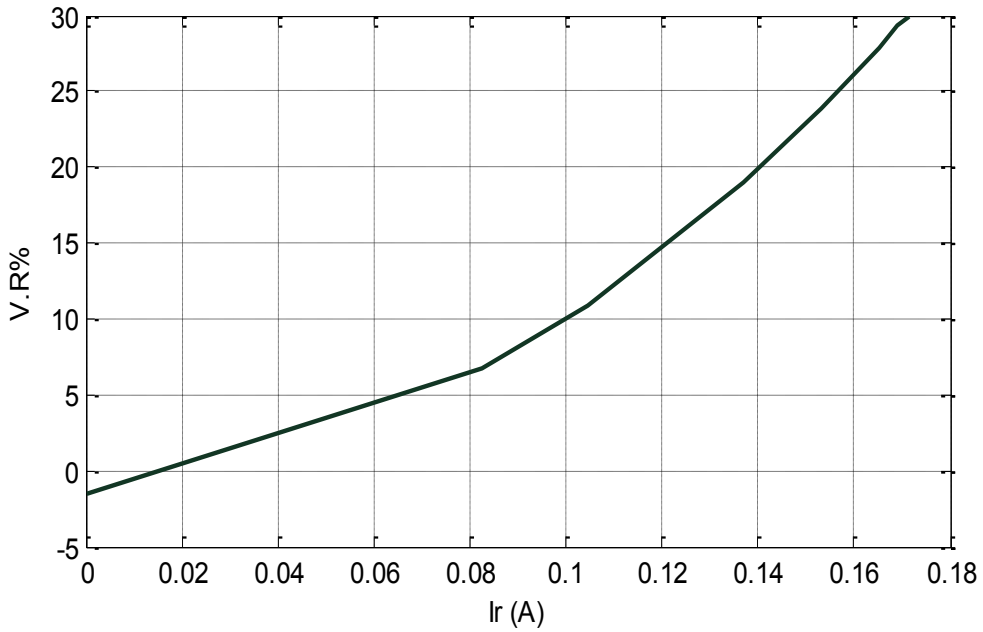


R_{av}, X_{av} & Y_{av} ???

RESULTS

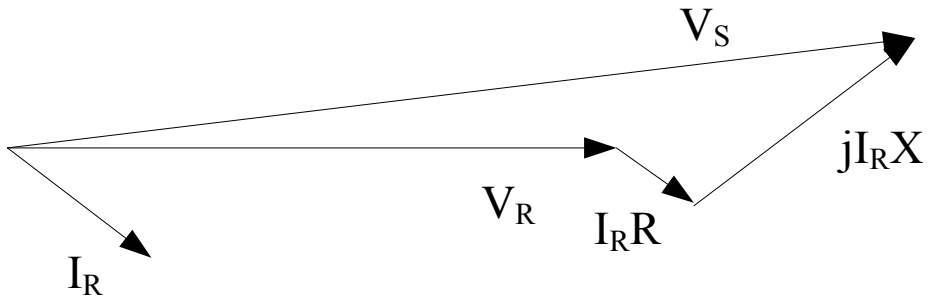


Efficiency % and load current (T-model)

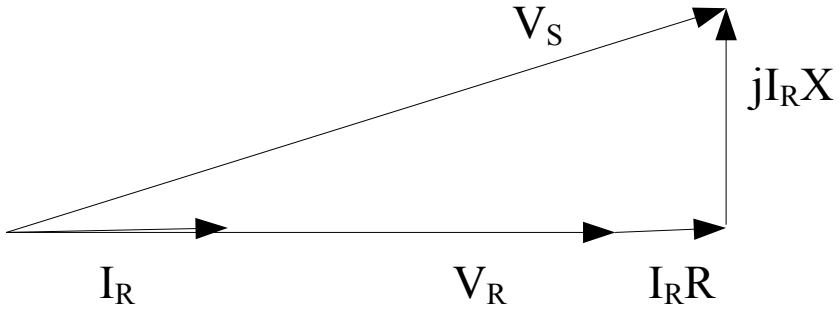


Voltage regulation % and load current (T-model)

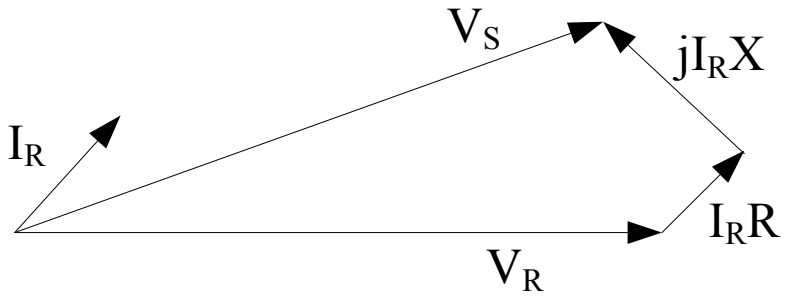
RESULTS



Phasor diagram with **Lagging PF**



Unity PF



Leading PF

QUESTIONS

1. Plot the phasor diagram at one recording data.
2. Calculate average TL resistance, inductance and capacitance.
3. Repeat these steps at unity power factor.
4. Repeat these steps at lead power factor.
5. Draw the efficiency and voltage regulation against IR for lag, lead and unity power factor on one figure.
6. Write your comment for all results.

DISCUSSION

1. What is the effect of load power factor on voltage regulation and efficiency of medium transmission lines?
2. A medium transmission line is open circuited at the receiving end. Will there be any current in the line at the sending end? Explain your answer

RESULTS

WHAT DO THE MEASUREMENT RESULTS INDICATE ? !

Comments !!

EXP.4 RESULTS

R	V_s v	I_s mA	I_r mA	V_r v	P_s w	P_r w	I_c mA	ΔV/2 v	V_c v	pf_s	pf_r
O.C	85	-	0	80	-	0	-	-	-	-	-
1	100	80	170	80	10	8	60	7	96	0.93	0.56
2	105	150	230	80	17	14	63	14	101	0.96	0.78
3	113	240	290	80	23	20	66	21	106	0.9	0.87
4	120	290	360	80	31	27	69	30	110	0.88	0.92
5	130	360	440	80	37	33	71	33	113	0.85	0.95

EXP.4 RESULTS

جدول النتائج
كامل
ورق A4

الرسومات
(ورق رسم بياني
+ مسطرة)

إجابة الأسئلة

Comments

THANKS